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Long-term Care Insurance Facilities and Interregional Migration of the Elderly in Japan[†]

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Abstract

Using municipality-level data of Japan, this paper empirically examines how the capacity of long-term care insurance facilities impacts interregional migration of the elderly. We construct net-migration data of the elderly population in each municipality by combining statistics available from existing sources. We find that interregional differences in capacity of long-term care insurance facilities generate strong magnetic effects on migration of the elderly. Our results indicate that family care is difficult and that long-term care insurance facilities are necessary for late-stage elderly in need of long-term care.

Keywords: Long-term care insurance facility, Interregional migration, Welfare magnet
JEL classifications: H75

1. Introduction

The importance of long-term care increases as the number of retirees increase. Moreover, the importance of long-term care facilities increases where the number of elderly increase and family support is weak. However, the supply of long-term care facilities in Japan is in shortage, and many elderly are waiting for admission in many municipalities.[1] Thus, the availability of long-term care facilities acts as a "welfare magnet" that prompts the elderly to migrate from one area to another. This phenomenon has attracted our attention.

There has been extensive research about differences in welfare service among regions and their effect on migration patterns. Recent empirical studies have questioned the extent of welfare migration. Other studies have examined interstate inequality in program benefits of the Aid to Family with Dependent Children (AFDC) and migration. Southwick (1981), Gramlich and Laren (1984), Blank (1988), Enchautegui (1997), and Borjas (1999) show a positive relationship between the level of welfare programs and migration, while Schroder (1995), and Levine and Zimmerman (1999) find that welfare programs have no effect on migration.[2]

Nonetheless, few studies have attempted to examine welfare levels and interregional migration in Japan. Nakazawa (2007) calculates the net migration of the elderly in the Tokyo metropolitan area between the years 2000 to 2005 by combining existing statistical materials and reveals that migration of the late-stage elderly is influenced by the level of long-term care facilities in each area.[3] However, it is not clear whether his observations pertain only to a specific municipality or on a nationwide scale. This paper examines issues for long-term care facilities and interregional migration of the elderly at a nationwide municipality-level.

This paper is organized as follows. Section 2 calculates the net migration of each municipality by age group, and we present an interregional migration trend. Section 3 conducts an empirical analysis using municipality-level data and examines the relationship between provision of long-term care facilities and interregional migration of the elderly. Section 4 concludes the paper.

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[1] According to an investigation by the Ministry of Health, Labour and Welfare in 2006, the number of those who are waiting for admission to a nursing home for the aged (number of applicants) is about 385,500 people. The national average ratio of the number of those waiting admission to the capacity of existing facilities is 101%. Especially, many waiting for admission are in major cities. For instance, the ratio is 126% in Tokyo and Kanagawa Prefecture.

[2] A summary of the relevant earlier research is provided in Cebula (1979), while the more recent research is summarized in Moffitt (1992) and Hayashi (2006).

[3] The Tokyo metropolitan area includes the following four prefectures: Chiba, Kanagawa, Saitama, and Tokyo.

2. Descriptive analysis on interregional migration of the elderly

2.1. Calculation procedure of the number of net migration of the elderly

The purpose of this paper is to present migration trends among the elderly at the basic municipality (city, town, and village) level after the introduction of the long-term care insurance in Japan.[4] However, the availability of data that can capture interregional migration in Japan is limited, and migration between municipalities by age groups cannot be captured from the statistical data open to the public now.[5] Therefore, it is necessary to calculate net migration of the elderly by combining existing statistics.

In this paper, we calculate net migration (population inflow minus outflow) using data obtained from the *Basic Resident Register* (Ministry of Internal Affairs and Communications) and from the *Vital Statistics of Japan* (Ministry of Health, Labour and Welfare). Specifically, we combined population statistics from the *Basic Resident Register* and the number of deaths from the *Vital Statistics of Japan*, and we calculated net migration by age group in each municipality.

Population by age group in the *Basic Resident Register* is presented at five-year intervals. The entire population within a given age group will enter the next-older age group each five years. We compared the population in 2000 with the population in 2005, and the difference was categorized into those who migrate in, those who migrate out, and those who die. For instance, a change in the number of persons age 55–59 for a specific municipality from 2000 to 2005 is defined by the following expressions:

$$\begin{aligned} N_{60-64}^{2005} - N_{55-59}^{2000} &= \left(IM - OM\right)_{55-59}^{2000-2005} \\ &\quad - \left(D_{55-59}^{2000} + D_{56-60}^{2001} + D_{57-61}^{2002} + D_{58-62}^{2003} + D_{59-63}^{2004}\right), \end{aligned} \tag{1}$$

where N is the total population, IM is the number of inflows, OM is the number of outflows, and D is the number of deaths. The superscript indicates the year of investigation, and the subscript indicates the age group. We assume NM is the number of net migration (the number of inflows minus the number of outflows) and rewrite the equation (1) as follows:

---

[4] Japan introduced the long-term care insurance in the year 2000.

[5] We can obtain statistics that capture the aggregate migration at municipality level from the *Population Census* (Ministry of Internal Affairs and Communications, MIC), the *Basic Resident Register* (MIC), the *Migration Survey* (National Institute of Population and Social Security Research), and the *Business Report of Long-term care insurance* (Ministry of Health, Labour and Welfare). However, we cannot capture in these data the number of net migrations of late-stage elderly after the introduction of the long-term care insurance.

$$
\begin{aligned}
NM_{55-59}^{2000-2005} &\equiv \left(IM - OM\right)_{55-59}^{2000-2005} \\
&= N_{60-64}^{2005} - N_{55-59}^{2000} + \left(D_{55-59}^{2000} + D_{56-60}^{2001} + D_{57-61}^{2002} + D_{58-62}^{2003} + D_{59-63}^{2004}\right)
\end{aligned} \tag{2}
$$

We then obtain net migration from 2000 to 2005 according to age group by combining the population by age group in the *Basic Resident Resister* with the number of deaths in the *Vital Statistics of Japan*[6] as equation (2).[7] Thus, we can calculate the net migration numbers of each age group for each municipality even though it is impossible to separate those who flow in and those who flow out.

Although the data year extends from 2000 to 2005, the number of municipalities has decreased greatly for this period through the large merger of municipalities during the Heisei era. To deal with this problem, we incorporated data from 2000 to 2004 into the municipality for the period beginning April 1, 2005.

2.2. Migration patterns of the elderly at prefecture level

Figure 1 illustrates net migration patterns of late-stage elderly (age 75 and over) at the prefecture level. Note that a dark color indicates net inflow and a light color indicates net outflow. Figure 1 suggests that late-stage elderly migrate to municipalities surrounding big cities such as Tokyo, Nagoya, and Osaka.[8] Migration patterns of the late-stage elderly display two trends: (1) migration from central cities to suburbs, and (2) migration from rural areas to suburbs of large cities. We hypothesize that two factors explain these migration patterns among the late-stage elderly. First, the elderly from central cities need long-term care facilities. Second, people residing in urban areas invite their elderly parents in from rural areas when the need for long-term care becomes apparent.

Figure 2 illustrates net migration patterns of early-stage elderly (age 65–74) at the prefecture level. It shows a trend in outflows from the metropolitan area that is remarkable among the early-stage elderly compared to the late-stage elderly. On the other hand, it shows an inflow

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[6] Because the *Vital Statistics of Japan* gathers data for deaths at five-year intervals, we cannot obtain the number of deaths for each year. Therefore, we assume that the number of deaths occurs in the middle of each age group (For example, age 62 if the range is 60–64 years old). We assume a simple mean value for the number of deaths within an age group and derive the number of deaths each year by linear interpolation between age groups.

[7] The *Basic Resident Register* documents the population size as of March 31 for each investigation year. On the other hand, the number of investigation year's deaths between January 1 to December 31 is gathered in the *Vital Statistics of Japan*. Someone who migrates into a given city after March 31 and dies by December 31 is counted only in the mortality data. It should be noted that there is a possibility of overestimating the number of deaths and thereby underestimating net migration.

[8] Figure 1 shows prefectures where net migration is positive: from the north, Ibaraki, Tochigi, Gunma, Saitama, Chiba, Kanagawa, Shizuoka, Aichi, Shiga, Nara, and Hyogo.

trend in prefectures in the Kanto area (Fukushima, Ibaraki, Tochigi, and Chiba), Nagano, Yamanashi, Shiga, Fukui and prefectures in Southern Kyushu (Miyazaki, Kumamoto, and Kagoshima), etc. This is the U-turn phenomenon after retirement. When we compare the migration patterns of the elderly, we can see a different trend between early-stage elderly and late-stage elderly. That is, the late-stage elderly migrate to suburbs around big cities, and the early-stage elderly return to the countryside.

2.3. Migration patterns of the elderly in metropolitan and urban areas

The net migration of persons below retirement age (age 55–64)[9], early-stage elderly (age 65–74), and late-stage elderly (age 75 and over) in three metropolitan areas is shown in Table 1.[10] Table 1 reports a net migration outflow among persons age 55–64 and among the early-stage elderly, while the trend among the late-stage elderly demonstrates a net inflow excluding the Osaka area.[11] In addition, there is a net outflow of the elderly in central cities such as the 23 wards of Tokyo, Nagoya-city, and Osaka-city. On the other hand, there is a net inflow of late-stage elderly in municipalities except the government-designated city in these areas. In the case of the late-stage elderly, the surrounding area absorbs immigrants from the central city and outside the area.

Table 2 shows the net migration of each age group in the government-designated cities.[12] The data show a marked inflow among age groups normally associated with entering school and starting work and an outflow among groups of retirement age. The data suggest that people spend their school years and work years in big cities and leave cities in their latter years. However, we cannot find the same trend among these government-designated cities. Among the late-stage elderly, net inflows are evident for Sapporo-city, Chiba-city, Yokohama-city, and Kobe-city, while the 23 wards of Tokyo, Nagoya-city, and Osaka-city demonstrate net population outflows, as we mentioned previously. Sapporo-city, especially, experiences a net inflow greater than other government-designated cities. The number of early-stage elderly migrating into Sapporo-city is 3,165, and the number of late-stage elderly is 4,594. Outflows

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[9] According to the *Migration Survey* (National Institute of Population and Social Security Research) in 2001, the main cause of migration among persons age 55–64 is mandatory retirement. This survey also shows that this population group is more likely to migrate from metropolitan areas to non-metropolitan areas.

[10] The definition by the Ministry of Land, Infrastructure and Transport and Tourism is used for the setting of three metropolitan areas. The Tokyo metropolitan area is composed of Chiba, Kanagawa, Saitama, and Tokyo. The Nagoya metropolitan area is composed of Aichi and Mie. The Osaka metropolitan area is composed of Hyogo, Kyoto, and Osaka.

[11] The trend shows a net outflow of late-stage elderly in the Osaka area. However, if Shiga, Nara, and Wakayama are included, the trend changes to net inflow.

[12] The government-designated city is a city that has a population greater than 500,000 and has been designated by government ordinance (under Article 252 of the Local Autonomy Law).

among the late-stage elderly of Hokkaido except Sapporo-city are 5,132 people, and most of those who migrate in Hokkaido will have been absorbed only in Sapporo-city.[13]

Table 3 shows the net migration of each age group for Japan's core cities. It reveals a net inflow among the late-stage elderly and a consistent net outflow among all age groups from school age to the early-stage elderly. Although trends differ among these core cities, the core cities and the surrounding cities of three metropolitan areas seem to be a demographic saucer where the late-stage elderly congregate.

3. Empirical analysis

3.1. The model

We estimate a magnitude for welfare-induced migration of the elderly. We employ the number of net migration of the elderly as a dependent variable and capacity of long-term care insurance facilities as independent variables. We concentrate on long-term care insurance facility service because elderly people have no incentive to migrate to another municipality to receive relatively enhanced at-home nursing service. As Takechi (1996) points out, when people relocate their parents, it is not necessarily to live with them. People frequently settle their parents in a facility near them. Moreover, Takechi (1996) shows that a main factor prompting elderly migration is that the aged cannot live alone in rural areas. Drawing upon his findings, we believe that the elderly prefer long-term care facility service.

We estimate the following regression model:

$$\begin{aligned} NM_i = \beta_0 + \beta_1 Welfare_i + \beta_2 Healthcare_i + \beta_3 Sanatorium_i \\ + \beta_4 Bed_i + \beta_5 Hsize_i + \beta_6 Alone_i + \beta_7 Prefecture_i + \varepsilon_i \ , \end{aligned} \tag{3}$$

where NM is the number of net migration and subscript and i indicates municipality. Based on migration data of the elderly from 2000 to 2005, we use independent variables in 2000 to deal with the problem of causal relation. We estimate the regression model (3) separately for the early-stage elderly (age 65–74) and the late-stage elderly (age 75 and over), respectively.

$Welfare$ is capacity of welfare facilities (*Kaigo Rojin Fukushi Shisetsu*), $Healthcare$ is

[13] Takechi (1996) discusses social hospitalization in Sapporo-city before the introduction of the long-term care insurance. He shows that the elderly might be hospitalized in nursing care facilities or hospitals in Sapporo-city by moving their resident card to Sapporo-city in winter. He named this phenomenon "bringing over for nursing care" because people who live in Sapporo-city bring their parents to be with them.

capacity of healthcare facilities (*Kaigo Rojin Hoken Shisetsu*), and *Sanatorium* is capacity of sanatorium-type medical care facilities (*Kaigo Ryoyo-gata Iryo Shisetsu*). These variables are divided by the number of population aged 65 or older of each municipality. These variables show quantitative enhancement of each facility. *Bed* is the number of beds in hospitals per senior citizen; it shows the enhancement level of medical service. It is a proxy for hospitalization of the elderly for non-medical reasons that results from a shortage of long-term care insurance facilities.

Hsize is the average number of persons per household, and *Alone* is the percentage of elderly who live alone (number of aged single households as a percentage of all households). The former shows strength of family support, and the latter shows opposite direction. Our hypothesis shows that population flows of the elderly from one municipality to another result from "bringing over for nursing care" by their children or with admission to facilities. To help further reduce unmeasured heterogeneity across municipalities, we have included a vector of prefecture dummy variables, *Prefecture*, to control for differences in prefecture spending on various programs, taxation, cost-of-living, amenities, and other factors that were common to all municipalities within the same prefecture, but varied across prefecture. ε is the error term.

3.2. Data

We calculate numbers for the net migration of the elderly as described in the previous section. Data on long-term care facilities are obtained from the *Survey of Institutions and Establishments for Long-term Care* (Ministry of Health, Labour and Welfare). The number of hospital beds is obtained from the *Survey of Medical Institutions* (Ministry of Health, Labour and Welfare). The numbers for population and households are obtained from the *Population Census* (Ministry of Internal Affairs and Communications).

We show summary statistics in Table 4. The average net migration number for the early-stage elderly is −4.8, and for the late-stage elderly it is 3.5. The maximum number of early-stage elderly migration is about 3,000 people, and that of late-stage elderly is over 4,000 people. The welfare facilities cover 1.9% of the population aged 65 or older. The healthcare facilities cover 1.1% of those, and the sanatorium-type medical care facilities cover 0.5% of those. However, these are distributed from zero to about 20% among municipalities. The average size of households is 3.6 people, and 7.7% of all households are aged single-person households.

3.3. Estimation results

We estimate the equation (3) for 2,522 nationwide municipalities. The estimation method we employed is ordinary least squares (OLS) with robust standard errors. The regression coefficients are reported in Table 5.

The results show that interregional differences in capacity of long-term care insurance facilities induce migration of the elderly nationwide in Japan. Especially, the coefficient on capacity of welfare facilities indicates it is the main factor for interregional migration. It has a larger impact on welfare-induced migration among the late-stage elderly than the early-stage elderly. The coefficient on size of household is not significant in the late-stage elderly sample, although it is significantly positive in the early-stage elderly sample. The coefficient on aged single-person household is significantly negative in the late-stage elderly sample. These results indicate that it is possible to invite the early-stage elderly parents, and family care is difficult and long-term care insurance facilities are necessary for the late-stage elderly.

4. Conclusion

As the population ages and family support weakens, Japan is suffering a shortage in providing long-term care insurance facilities. In such a situation, we see the "welfare magnet" effect of the elderly migrating to areas where long-term care is more available. In this paper, we conduct an empirical analysis on the migration of the elderly, a subject that has received little attention in Japan.

First, we present net migration data per age group by combining existing statistics, and we capture migration patterns of elderly who seek long-term care. The results show three migration patterns: (1) migration from central cities to suburbs, (2) migration from rural areas to suburbs, and (3) migration into core cities in each local area. The migration trend can be especially seen strongly in three metropolitan areas.

Second, we estimate a magnitude of welfare-induced migration using municipality-level data. The empirical evidence in this paper is consistent with the hypothesis that interregional differences in capacity of long-term care insurance facilities generate strong magnetic effects on migration of the elderly. The results show the welfare magnet effect not only in selected areas but also nationwide in Japan.

With the aging of the baby-boom generation, the trend in elderly migration becomes increasingly stronger. When discussing the direction of Japan's long-term care insurance policy, we cannot ignore the factor of migration of the elderly.

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Figure 1　Net migration of late-stage elderly (age 75 and over)

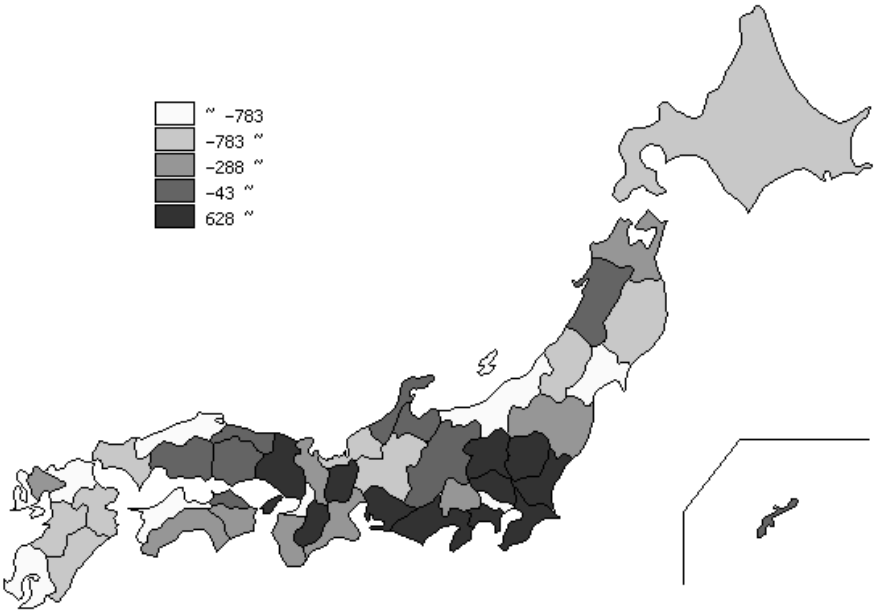

Figure 2　Net migration of early-stage elderly (age 60–74)

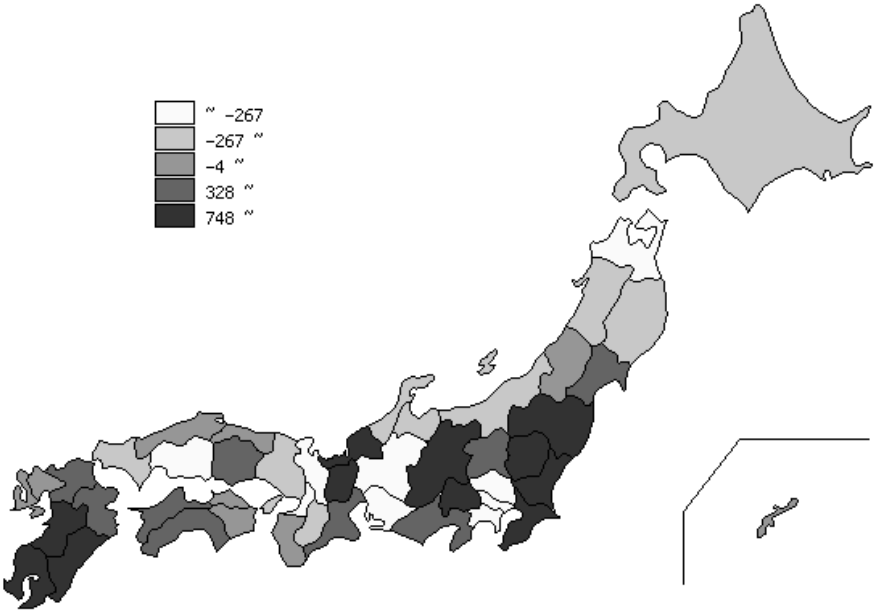

Table 1 Number of net migration in three metropolitan areas

	age 55-64	age 65-74	age 75+
Three metropolitan areas			
Total	-56,530	-27,045	16,530
23 wards+gov.designated city	-32,033	-21,611	-18,752
Others	-30,889	-7,944	31,027
Town and village	6,391	2,511	4,255
Tokyo area			
Total	-32,839	-13,375	15,851
23 wards	-19,088	-18,377	-16,606
23 wards+gov.designated city	-27,744	-20,022	-13,121
Others	-9,739	3,770	25,554
Town and village	4,644	2,877	3,418
Nagoya area			
Total	-3,442	-1,702	1,335
Nagoya-city	-3,226	-427	-1,342
Others	-893	-746	2,278
Town and village	677	-530	399
Osaka area			
Total	-20,249	-11,967	-656
Osaka-city	-1,660	-2,385	-4,846
Osaka-city+gov.designated city	-1,064	-1,162	-4,288
Others	-20,256	-10,969	3,195
Town and village	1,071	164	438

Table 2 Number of net migration in the government-designated cities

	age group						
	age 15-24	age 25-34	age 35-44	age 45-54	age 55-64	age 65-74	age 75+
Sapporo	22,288	-3,098	997	2,650	4,051	3,165	4,594
Sendai	14,807	-9,111	-1,928	-958	-1,008	43	-818
Saitama	9,563	10,405	1,930	1,157	-2,026	-1,265	-1,827
Chiba	6,246	1,289	2,793	590	-481	868	1,796
Yokohama	32,523	32,347	11,398	3,401	-4,044	-262	3,246
Kawasaki	25,070	24,507	-7,411	-130	-2,104	-987	269
Nagoya	15,660	5,719	-1,234	-1,116	-3,226	-427	-1,342
Kyoto	19,908	-14,990	-5,436	309	-390	-212	-1,040
Osaka	36,087	13,170	-7,484	1,883	-1,660	-2,385	-4,846
Kobe	6,523	237	5,898	2,111	987	1,434	1,598
Hiroshima	2,485	3,081	-561	-1,471	-2,033	-497	706
Kitakyusyu	-696	-7,447	-1,031	-1,003	-1,159	-1,053	-2,440
Fukuoka	27,332	2,379	190	1,527	-278	280	198
Tokyo 23 wards	177,030	121,189	10,731	3,189	-19,088	-18,377	-16,606

Table 3 Number of net migration in the core cities

	age group						
	age 15-24	age 25-34	age 35-44	age 45-54	age 55-64	age 65-74	age 75+
Asahikawa	-2,088	-1,276	-372	-475	509	38	98
Akita	-2,126	-172	324	-90	13	42	133
Koriyama	-874	1,223	-71	-379	40	91	200
Iwaki	-4,093	-19	-230	-153	320	70	-120
Utsunomiya	-340	5,052	-161	-695	-706	-22	206
Funabashi	6,027	3,913	-1,092	115	-1,101	-707	690
Yokosuka	1,707	-3,319	-264	-565	-41	200	407
Sagamihara	8,166	1,225	-2,347	-133	-620	159	876
Niigata	-1,835	739	988	-89	-2	131	320
Toyama	-631	-547	-129	-33	-23	71	46
Kanazawa	1,082	-1,629	-755	-720	-477	-130	191
Nagano	-2,422	649	32	-392	71	9	257
Gifu	-108	-1,790	160	-47	-388	-356	2
Shizuoka	-3,581	-1,836	-944	-911	-1,024	-588	-58
Hamamatsu	-375	5,308	-339	-77	-107	123	369
Toyohashi	140	-269	47	-169	-79	33	115
Toyota	3,905	-1,068	-1,971	-561	-831	-93	251
Okazaki	387	3,820	749	123	-13	38	-12
Sakai	553	-2,508	-1,176	-1,029	-2,273	-1,131	238
Takatsuki	635	-3,798	-2,663	-563	-1,359	-535	291
Higashiosaka	3,164	-4,157	-2,095	-136	-1,168	-1,202	-334
Himeji	-686	-219	-1,078	-470	-463	-102	-124
Nara	-353	-4,203	-986	-331	-421	167	429
Wakayama	-1,566	-2,389	-844	-571	-813	-248	44
Okayama	2,298	944	-76	-61	-77	94	411
Kurashiki	282	99	218	-41	-90	-83	393
Fukuyama	-2,497	674	-209	-329	-42	-52	272
Takamatsu	-1,495	2,656	-570	-729	-498	-10	55
Matsuyama	249	-1,247	893	-44	673	144	291
Kochi	-231	1,012	80	-110	-128	89	90
Nagasaki	-5,080	-3,496	-801	-996	-619	-486	-459
Kumamoto	1,693	-1,103	-23	-750	-563	279	662
Oita	-1,863	84	714	62	-5	176	443
Miyazaki	-1,936	815	499	-462	525	165	175
Kagoshima	-11,715	-2,598	1,204	-283	568	147	315
Total	-15,606	-9,433	-13,287	-12,098	-11,208	-3,480	7,162

Table 4 Descriptive statistics

Variables	Mean	Std. Dev.	Min	Max
Dependent variables				
Number of net migration of early-stage elderly	-4.788	174.697	-2799	3165
Number of net migration of late-stage elderly	3.538	224.909	-4846	4594
Independent variables				
Welfare	0.019	0.019	0.000	0.243
Healthcare	0.011	0.017	0.000	0.191
Sanatorium	0.005	0.012	0.000	0.274
Bed	0.060	0.070	0.000	1.002
Size of Household	3.056	0.456	1.701	4.567
Alone	0.077	0.041	0.007	0.291

Table 5 Estimation results

	Number of net migration of late-stage elderly		Number of net migration of early-stage elderly	
	(1)	(2)	(3)	(4)
Welfare	1136.79 ***	1485.05 ***	323.01 ***	603.92 ***
	(215.78)	(263.37)	(92.52)	(180.16)
Healthcare	250.94 ***	218.66 ***	278.57 ***	105.68
	(88.91)	(90.94)	(79.62)	(68.34)
Sanatorium	239.67	89.06	102.81	-100.95
	(323.79)	(332.26)	(240.73)	(245.51)
Bed	53.84	51.66	126.42 ***	130.70 ***
	(53.26)	(58.21)	(39.29)	(44.20)
Size of household	-14.14	-27.08	72.53 ***	39.74 ***
	(21.16)	(17.97)	(18.27)	(13.14)
Alone	-978.87 ***	-1213.06 ***	357.36 ***	-155.93
	(157.08)	(133.30)	(127.88)	(96.72)
Constant	93.71	147.35 ***	-271.36 ***	-141.56 ***
	(80.68)	(62.85)	(70.10)	(48.00)
Prefecture dummy	No	Yes	No	Yes
R-squared	0.034	0.072	0.029	0.115
Number of observations	2522	2522	2522	2522

Note: Robust standard errors are in parentheses. ***, **, and * indicate significance at 1%, 5%, and 10% level, respectively.